

**Commonwealth of Kentucky**  
**Division for Air Quality**  
***PERMIT STATEMENT OF BASIS***

TITLE V DRAFT PERMIT NO. V-04-015  
PACTIV CORPORATION  
WURLAND, KY  
JUNE 26, 2004  
CAROLINA ALONSO, REVIEWER  
PLANT I.D. # 21-089-00014  
APPLICATION LOG # 51263 (G479)

**SOURCE DESCRIPTION:**

Pactiv Corporation operates a polypropylene foam manufacturing plant. The product, Microfoam®, is used for packaging purposes. The raw materials that are used in the process are polypropylene resin and blowing agents (methylene chloride and compound A). Compound A is not a regulated air pollutant. The entire process is a closed system. The blowing agents are not consumed in the process. They are recovered after the Microfoam® is manufactured.

Polypropylene resin is received by rail in covered hoppers. The resin is unloaded by vacuum into 4 silos, then airveyed to a resin feeder which feeds the resin to a heated resin melter. The melted resin is then mixed with the blowing agents (methylene chloride and Compound A) and extruded through a die, forming the Microfoam® sheets. The Microfoam® sheet is then directed to an enclosed room area that allows the blowing agents to be recovered. The Polypropylene Foam Extrusion Line includes all the process units from when the resin is melted to the enclosed room where the blowing agents are recovered.

Then, the Microfoam® is processed in the wind up area for packing and shipping. Waste foam is directed to a shredder (trim flake recovery) and recycled into the process.

The methylene chloride is stored in the 06 (06A) Methylene Chloride Storage Tank. Additionally, Compound A, is stored in 07 (06B) Storage Tank B and 08 (06C) Storage Tank C. All three (3) tanks are located outside the facility. The tanks are surrounded by a dike and equipped with underground fill pipes. After mixing with the resin, the methylene chloride and Compound A vapors are directed from the enclosed room area and die area to a carbon adsorption, 05 (08) Decanting System, and condensation area, 03 (02) Solvent Recovery System, here the blowing agents are recovered and recycled back into the process utilizing the 04 (05) Solvent Make-up System.

**COMMENTS:**Emissions:

The facility's major source of emissions is methylene chloride, the only hazardous air pollutant (HAP) emitted. The emissions of all other regulated air pollutants are below major source thresholds.

Pollutant	Potential (TPY)
PM/PM <sub>10</sub>	14.51
SO <sub>2</sub>	.00824
NO <sub>x</sub>	1.37
CO	1.15
VOC	.0756
HAP ≥ 10 tpy (by CAS)	
Methylene Chloride	517.90

Four (4) carbon adsorption beds are used to control the methylene chloride emissions from the 01 (01) Polypropylene Foam Extrusion Line. This is the only stack emission on site. The carbon adsorption beds are part of the 05 (08) Decanting System. The 05 (08) Decanting System is part of the Recovery System that also includes the 03 (02) Solvent Recovery System. The capture efficiency of the Recovery System is 96% and the control efficiency of the control equipment is 99.1%. In addition to the stack emissions from the carbon beds, the process has fugitive emissions that contribute to the total plant emission of methylene chloride. The solvent recovery process is divided into process points for estimating fugitive emissions:

- 02 (07) Polypropylene Foam Extrusion Line
- 03 (02) Solvent Recovery System,
- 04 (05) Solvent Make-up System,
- 05 (08) Decanting System,

Each emission point represents equipment in the same general area. Separate emission factors are not given for each process unit.

The basis for the emission factors for this facility except for the 06 (06A) Methylene Chloride Storage Tank is the source, Pactiv Corporation. Each of emission points except for the 06 (06A) Methylene Chloride Storage Tank is a group of process units; therefore, the emission factor is for the entire emission point and separate emission factors are not given for each process unit.

In the original Title V application, the emission factors for the methylene chloride emissions from the 02 (07) Polypropylene Foam Extrusion Line- Fugitive Emissions and the 01 (01) Polypropylene Foam Extrusion Line were both listed as 18.0 lb/ton of material processed. The material being processed for this calculation is methylene chloride and not the polypropylene resin. The application states that the two factors are based on the 99.1% control efficiency of the carbon adsorption beds. The fugitive emissions are the emissions that are not captured by the control equipment; thus, the emission factor for the fugitive emissions cannot be based on the control efficiency of the adsorption beds. For the Polypropylene Foam Extrusion Line, the methylene chloride fugitive emissions are 4% of the total emissions from Polypropylene Foam Extrusion Line before controls.

In the new DEP7007B forms that Pactiv submitted, the emission factor for the 01 (01) Polypropylene Foam Extrusion Line is listed as 2000 lb/ton of material processed. Again, the material processed is methylene chloride. This emission factor does not include the capture and control efficiencies. Since the Recovery System's capture efficiency equals 96%, the 02 (07) Polypropylene Foam Extrusion Line- Fugitive Emissions are calculated using the following equation:

$$\text{Potential Hourly Methylene Chloride Fugitive Emissions} = [\text{Maximum Hourly Methylene Chloride Processing Rate (lb/hr)} * \text{Overall Emission Factor}] / [2000 \text{ lb/ton}]$$

$$\text{Overall Emission Factor} = 2000 \text{ lb/ton}^1 * (1 - \text{Capture Efficiency})$$

$$\text{Potential Hourly Methylene Chloride Fugitive Emissions} = 2288 \text{ lb/hr} * 2000 \text{ lb/ton material} * (1 - .96) / 2000 \text{ lb/ton} = 91.52 \text{ lb/hr}$$

Furthermore, since the control efficiency equals 99.1%, the 01 (01) Polypropylene Foam Extrusion Line are calculated using the following equation:

$$\text{Potential Hourly Methylene Chloride Stack Emissions} = [\text{Maximum Hourly Methylene Chloride Processing Rate (lb/hr)} * \text{Overall Emission Factor} * (1 - \text{Control Efficiency})] / [2000 \text{ lb/ton}]$$

$$\text{Overall Emission Factor} = 2000 \text{ lb/ton}^1 * \text{Capture Efficiency}$$

$$\text{Potential Hourly Methylene Chloride Stack Emissions} = 2288 \text{ lb/hr} * 2000 \text{ lb/ton material} * .96 * (1 - .991) / 2000 \text{ lb/ton} = 19.77 \text{ lb/hr}$$

Utilizing the potential hourly emissions above, the potential annual fugitive emissions are calculated to be 400.86 tons per year of methylene chloride from the Polypropylene Foam Extrusion Line while

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<sup>1</sup> This is the emission factor that is listed in Kentucky Emission Inventory System. Prior to the issuance of the proposed permit, the emission factor will be changed and the new value will be the Overall Emission Factor.

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the potential annual stack emissions total 86.59 tons per year of methylene chloride from the Polypropylene Foam Extrusion Line. In the Emissions Inventory System only the control efficiency

is inputted; therefore, the emission factors that will be listed prior to the issuance of the proposed permit in the Kentucky Emissions Inventory System for the 01 (01) Polypropylene Foam Extrusion Line and the 02 (07) Polypropylene Foam Extrusion Line- Fugitive Emissions will include the capture efficiency, thus, the overall emission factor for each emission point that will be a different value. Furthermore, when the emissions are calculated after testing is completed and the Division has validated the test report, the capture and control efficiencies that will be utilized are those from the testing data.

Another change in this permit is for what had been previously listed as (06) Tank Farm Area Fugitives. According to the information in the application, the only regulated air pollutant from the tanks is methylene chloride and only the Methylene Chloride Storage Tank stores methylene chloride while Storage Tank B and Storage Tank C store compound A. Thus, the Tank Farm Area Fugitives emission unit has been split into three emission units: 06 (06A) Methylene Chloride Storage Tank, 07 (06B) Storage Tank B, and 08 (06C) Storage Tank C. The previous emission factor listed in the Kentucky Emissions Inventory System was 0.1 lb/tons product produced. The methylene chloride emissions from 06 (06A) Methylene Chloride Storage Tank were calculated utilizing Tank 4.0 and it was determined that the emission factors were 3.3 lb/10<sup>3</sup> gallon throughput for working losses and 1.2 lb/10<sup>3</sup> gallon for standing losses. After converting units, it was established that the emission factors are not equivalent; thus, the emission factor for 06 (06A) Methylene Chloride Storage Tank will be changed in the Kentucky Emissions Inventory System prior to the issuance of the final Title V permit.

Adding the methylene chloride fugitive emissions from the 03 (02) Solvent Recovery System, the 04 (05) Solvent Make-up System, the 05 (08) Decanting System, and the 06 (06A) Methylene Chloride Storage Tank to the Polypropylene Foam Extrusion Line's fugitive and stack emissions, the total single HAP emitted for the source is 517.90 tons per year.

EP Number	Description	Annual Potential Emissions	
01 (01)	Polypropylene Foam Extrusion	86.59	TPY
02 (07)	Polypropylene Foam Extrusion Fugitive Emissions	400.86	TPY
03 (02)	Solvent Recovery System	9.42	TPY
04 (05)	Solvent Make-up System	15.53	TPY
05 (08)	Decanting System	1.41	TPY
06 (06A)	Methylene Chloride Storage Tank	4.10	TPY
		517.90	TPY

Methylene Chloride Emissions Testing:

Due to the potential amount of methylene chloride emitted from the facility, the Division is requiring in this permit that Pactiv conduct testing to determine fugitive and stack emissions from the Polypropylene Foam Extrusion Line. Pursuant to Section III (10) of the Policy Manual of the Division for Air Pollution Control, incorporated by reference in 401 KAR 50:016, Section 1(1): “When carbon adsorbers are used, it is not necessary to determine capture efficiency since the VOC recovered can be compared directly to the emission standard.” Thus, a mass balance calculation will be used based on input, output, and amount of methylene chloride. For the stack emissions testing, Pactiv has the option of selecting Method 18, Method 25, or Method 25A. The testing must be carried out within 60 days of issuance of the proposed permit. Thus, the source must submit the protocol they would like to carry out to verify the capture efficiency and to determine the stack emissions thirty days prior to testing. During the testing, the Polypropylene Foam Extrusion Line has to run at the maximum processing rate. Pursuant to the “Policy Manual of the Division of Air Pollution Control” incorporated by reference in 401 KAR 50:016, Section 1(1), when demonstration of compliance, through performance test, is made at a production rate less than the maximum specified in the application form and the construction permit, the operating permit shall be conditioned to limit the production rate to no more than 110% of the average test rate.

Methylene Chloride Emissions Modeling:

Furthermore, for Pactiv Corporation to demonstrate compliance with 401 KAR 63:020, the Division has required in this permit that Pactiv submit air dispersion modeling utilizing the Industrial Source Complex Model (ISC3) and an analysis of all affected facilities that emit methylene chloride as to the adequacy of controls and/or procedures and emission potential for evaluation by the Division within 30 days of submittal of the test report. The test report is due within 45 days of conducting the testing. Pactiv certified that all their emission points are in compliance; however, when the Division required modeling to demonstrate compliance with 401 KAR 63:020, Pactiv Corporation asked for an extension. They were granted the extension and then they asked for another one. At this point, the Division has decided that the modeling would be a requirement specified in the permit. The modeling has to be submitted to the Division within 30 days of submittal of the report for the testing. This requirement is listed in **SECTION B – EMISSION POINTS, EMISSION UNITS, APPLICABLE REGULATIONS, AND OPERATING CONDITIONS** under Compliance Demonstration for 401 KAR 63:020 and **SECTION I - COMPLIANCE SCHEDULE**.

Applicable Regulations

401 KAR 63:020, *Potentially Hazardous Matter or Toxic Substances*, applies to each affected facility which emits or may emit potentially hazardous matter or toxic substances, provided such emissions are not elsewhere subject to the provisions of the administrative regulations of the Division for Air Quality.

401 KAR 63:021, *Existing Sources Emitting Toxic Air Pollutants*, applies to sources which were issued a permit pursuant to 401 KAR 50:035 with conditions based on this administrative regulation or 401 KAR 63:022.

**EMISSION AND OPERATING CAPS DESCRIPTION:**

In permit O-91-012 (Revision 4) in accordance with 401 KAR 63:022, Pactiv Corporation had a source-wide methylene chloride emission limit of 181 lb/hr and the methylene chloride processing rate was limited to 2288 lb/hr. Thus, 401 KAR 63:021 applies to all the facilities at Pactiv that process methylene chloride and the emission and operating limits are also conditions in the Title V operating permit. The emission limit can only be achieved when the 03 (02) Solvent Recovery System and the 05 (08) Decanting System are operated; therefore, the permit has the condition that the 03 (02) Solvent Recovery System and the 05 (08) Decanting System must be in operation while the methylene chloride is being processed in the Polypropylene Foam Extrusion Line.

**CREDIBLE EVIDENCE:**

This permit contains provisions which require that specific test methods, monitoring or recordkeeping be used as a demonstration of compliance with permit limits. On February 24, 1997, the U.S. EPA promulgated revisions to the following federal regulations: 40 CFR Part 51, Sec. 51.212; 40 CFR Part 52, Sec. 52.12; 40 CFR Part 52, Sec. 52.30; 40 CFR Part 60, Sec. 60.11 and 40 CFR Part 61, Sec. 61.12, that allow the use of credible evidence to establish compliance with applicable requirements. At the issuance of this permit, Kentucky has not incorporated these provisions in its air quality regulations.